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A Weekly Journal Devoted to Industrial and Engineering Chemistry

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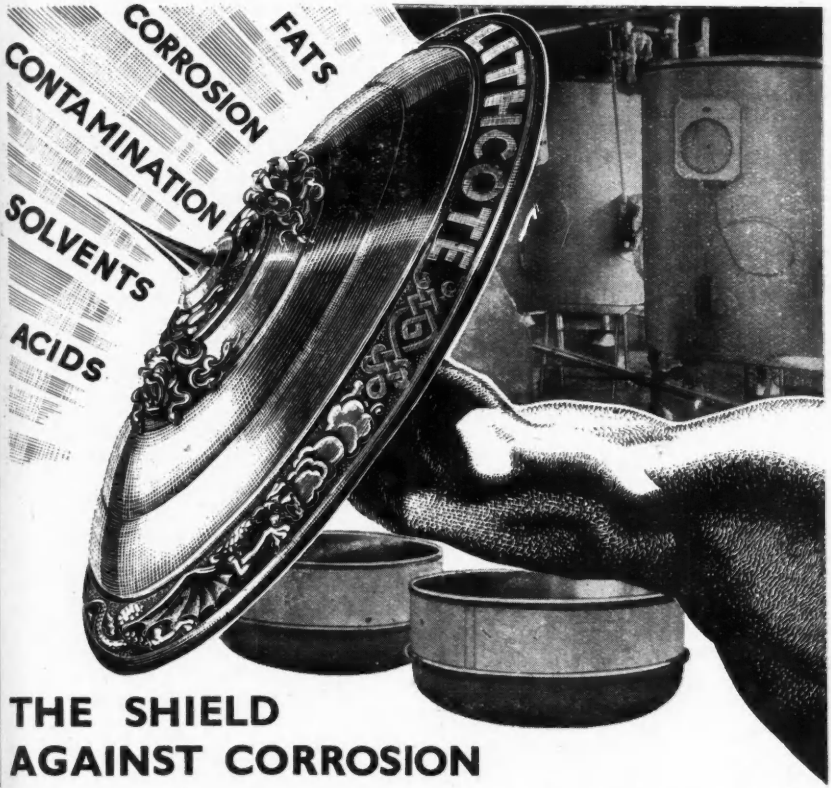

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

BOUVERIE HOUSE, 154 FLEET STREET, LONDON, E.C.4

Telegrams: ALLANGAS FLEET LONDON — Telephone: CENTRAL 3212 (10 lines)

GLASGOW: 116, Hope Street (Central 3970) — BIRMINGHAM: Daimler House, Paradise Street (Midland 0784-5

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Technical Intelligence

MONDAY, October 4, was a day that will remain in our memory. For the first time, so far as our recollection goes, we found a queue of people some twenty-five yards long and some four or five deep moving slowly towards the doors of the Chemical Society's offices. This, one of the few occasions on which there has been a queue to hear a scientific paper at an ordinary meeting of the London section of the Society of Chemical Industry, was a tribute to the intense interest aroused by the subject of "The Organisation and Use of Technical Intelligence Services," a subject introduced by Mr. S. J. Johnstone, of the Imperial Institute, and followed by some half a dozen other speakers all equally eminent in their own particular sphere. There is no possible doubt that the great volume of information published throughout the world is making scientific and technical development proceed at a greater rate than it has ever done before, and it is of the first importance that every research association and every research laboratory, and, indeed, every technical man who is interested in the advancement of his business, should be kept up to date with this great volume of literature. The efficient use of scientific information holds the key to the future of humanity.

For as long as we can remember scientific societies have published abstracts in their journals. These abstracts are of very great value, but the fact remains that almost every technical library and research association, together with many individual firms, finds it necessary to publish its own abstracts. The reason for this, as was stated by one of the speakers, is that technical literature requires to be abstracted with a particular end in view. The scientific abstractor will look in a paper for certain information which he regards as being of the first importance; a commercial abstractor will only regard as important the impact of the information on his particular trade. An abstract required for the scientific staff will only need to be of an informative character, since if the paper is of interest to the work they are doing they will require to consult it in full; whereas an abstract for the sales staff or for the less severely technical reader will obviously omit much that would interest the research man, but certain paragraphs that may be of small interest to him will require to be reproduced very fully or even completely reprinted. Thus,

On Other Pages

although the same paper may be abstracted by half a dozen bodies, it can be claimed that these abstracts in no way overlap.

The work of an information department may be wide or narrow in scope according to the policy of those who control it. At the head of its duties we place the provision of abstracts. This is necessary in order that every piece of information shall be docketed. Parallel with this is the provision of a card index of all information that comes into the department. This information may be published in books or in articles or in scientific papers or it may be obtained from technical reports of members of the organisation. It is found that the card index will usefully provide also a summary of the paper, an estimate of its length and many other details that enable a good deal to be learnt about it before turning it up. A more ambitious intelligence service will issue monographs or bulletins on technical subjects. These may be produced by the librarian and his staff in a sufficiently large library or they may be "farmed out" to specialist members of the staff. The intelligence department should also be able to provide information for the solution of difficulties arising in the work of the organisation or propounded by customers, or, in the case of research associations, to answer questions asked them from outside. Answers to such questions may involve nothing less than the collection of all available information on a particular process or method of manufacture.

When a research library decides to enter upon a new investigation, the intelligence department will frequently be asked to provide a complete list, and perhaps a summary, of all the information previously published on that subject. The collection and translation of foreign publications is, of course, an obvious task of the department. The sales branch may ask for economic statistics and information about raw materials. In many of these organisations the collection of trade catalogues is an important item.

The staffing of an information department is a matter of the first importance. Clearly, the men who are suitable for the purpose must be able to turn their mind from one subject to another with ease and may have to deal with a score of different subjects in the course of a day. They must also have in their make-up something of the detective, because the tracing of information required may be exceedingly difficult and a small clue will often be all that is obtained. If this is not detected as being a clue the solution may escape the investigator. There is a great deal in common between a skilled research man and a skilled intelligence man. The one makes his investigations through experiment and the other through the medium of published literature aided by his own power of deduction.

The importance of the intelligence department and the vast amount of useful work it can do leads to the problem of who should be provided with such a department. Obviously, all research associations should have one. Most industries, too, should possess one, perhaps under the industry's own trade association, because through the working of the intelligence service firms in the industry can have their problems solved at small cost and their customers can also be assisted materially in using the industry's products. Inquiries to the intelligence department often reveal gaps in existing knowledge and lead to major researches. Large firms that are developing new products will generally find an intelligence department to be essential for the assistance of their customers and for the further development of their product for new uses and its improvement for existing uses. Smaller firms, however, may find an intelligence department expensive, although a very useful department of this nature can be run with one librarian possessing technical knowledge aided by the other members of the staff in their spare time or as called upon. It will not be forgotten that Sir Harold Hartley suggested that in every firm there should be one individual whose duty it was to notice what work has been published and to watch the possibility of using that work in furthering the work of the firm. He regarded this as the nucleus of a research department. There is something to be said for regarding it the nucleus as an intelligence department.

NOTES AND COMMENTS

Civil Servants Promote Science

THERE is still, we believe, a popular superstition to the effect that the professional civil servant is an enemy of science, or, if not an enemy, at least an obstructionist. It is, of course, very largely nonsense, like most popular superstitions, and probably owes its genesis to some unfortunate experiences with subordinate clerks—for there are exasperating individuals in the civil service as in every other large organisation. Something that should go far to quash the superstition once and for all is an event that has occurred this week: the meeting organised on Tuesday by the Institute of Professional Civil Servants for scientists from many nations. The aim of the meeting was to foster co-operation between scientists of various countries, and the ball was opened by Sir Stafford Cripps. We have recently adverted to the friendly intercourse between the scientists of Austria and Czechoslovakia that has been taking place in this country, and we may hope that our good friends the Civil Servants will have aided scientists to take one more step along the road of international friendship. It is too much to hope that all the scientific institutions of occupied Europe will share the good luck of the Marine Biological Station at Naples; and the rehabilitation of such of them as are destroyed will need all the combined goodwill that scientists of all nations are able to provide.

Cartels and Conscience

WHEN Lord McGowan, in a recent article, wrote that "Industry is beginning to develop a conscience," he raised an issue of far greater magnitude than the words themselves would imply. Some idea of the vast scope of the principles underlying this apparently simple proposition may be gathered from the discussion that has been going on in *The Times* on the future of cartels. The important thing about this discussion is that it is quite dispassionate. Nobody is shrieking about "international thugs," or anything of that sort, but a basic examination of the political meaning of cartels is being undertaken. A correspondent claims that the existence of cartels is a negation of democracy, and sees in them an adaptation of the feudal system, with the "industrial conscience" taking the place of *noblesse oblige;* and asks whether we are prepared to trust ourselves so completely to the conscience of the cartels. A proponent of the cartel system, or what he suggests may more fashionably be called the system of Commodity Agreements, defends them on the ground that they do away with the evils of unrestricted competition, and also puts forward the argument of safety in expediency—the cartels, in fact, will behave themselves because it is worth their while. Moreover, the place of competition in price is taken by competition in quality and in service, backed by a powerful research organisation. That is very well—provided that the research effort is directed towards real improvements, and not, as the opponents of the system fear, towards "aggressive selling," a method whereby profits which would appear unduly high are absorbed in elaborate sales methods, at the expense, of course, of the consumer.

The Safeguard of Publicity

IT appears obvious at all events, that if there are to be commodity agreements—and it is pointed out that it is impossible to prevent men with a common commercial interest from coming together and making agreements among themselves—then there must be also some rigorous safeguards to ensure that such agreements are in the public interest. The best of those that have so far been suggested is Publicity, enforced by the State at least in the country of the cartel's domicile, probably in every country where it operates. There would appear to be scope here for an international organisation. If some impartial and international economic check could be imposed, it would remove the chief objection to cartels—that the control of prices and the consequent distribution of income becomes entrusted to the hands of small groups of industrialists without public responsibility. No doubt an utterly benevolent cartel would operate for the greatest good of the greatest number; but we have yet to see so utopian a body in being. One interesting recent event in the industrial

world may conceivably have some bearing on the question, and that is the appointment by Lever Bros. and Unilever, Ltd., of an "adviser on social and political questions" in the person of Professor David Mitrany, a Rumanian savant with experience at the London School of Economics, the Universities of Harvard and Princeton, and the Royal Institute of International Affairs.

The Fuel Industry

IT is inevitable that the chemical industry should watch with an interested eye any fundamental change, or suggested change, in the organisation of the fuel industry. Change of such a kind was forecast by Dr. E. W. Smith last week, in his address as president of the Institute of Fuel. Dr. Smith is distinguished both as a chemist, as a chemical engineer, and as a gas engineer, and his considered opinions deserve the fullest and most detailed attention. In the address in question he took a long step towards the definition of the "National Fuel Policy," which, as he himself said, neither he nor anyone else had so far defined clearly. Though he did not presume as yet to go so far as actually to define such a policy, he did what is almost as useful—perhaps quite as useful in the present initial stage of the problem—namely, to formulate a basis for a survey on which a national fuel policy may be founded. The four fields to be surveyed are, in his opinion: (1) The importance of fuel to the nation; (2) The availability of coal of all kinds; (3) The uses to which coal is being put; and (4) The efficiency with which coal is being used. It is obviously with the third and fourth points that the chemical and chemical engineering industries are principally concerned.

Gas Reorganisation

DR. SMITH went so far as to say that, from a national point of view, he considered it essential that the coal, gas and electrical industries should in future completely reverse their past policies, and, while supplying the consumer with all his requirements of heat, light, and power in the most liberal way, should at the same time guarantee the nation that such supplies shall be used in the most efficient way. This implies the availability and maintenance of carbonising plant, as well as a campaign for its improvement. This last can be achieved not only by research—of which there might well be more in this country—but also by improvements in administration. As one step towards attaining this end, Dr. Smith stated that he believed the time had come when, from the point of view of the consumer and the national welfare, the system—or lack of system—that had grown up within the gas industry, of so many autonomous individual units of production and distribution, required a very thorough overhaul. The industry should be rationalised, as an industry as distinct from individual units, and regionalised. We feel sure that such a policy will meet with the approval of the chemical industry, as well as the further suggestion that such a reorganisation should depend on the findings of an independent committee; and it is good news to hear, from so outstanding an authority as Dr. Smith, that the fuel industry is giving urgent consideration to these fundamental questions.

B.B.C. Science

THE B.B.C., in spite of the fact that it owes its existence to the ingenuity of scientists and technologists, is not at its happiest when it comes to broadcasting popular science talks. At the moment a series of weekly talks on applied science is to be heard. The scientists taking part are very distinguished, the subjects of their talks well selected for topical interest—the odd thing is that some of the scientists are talking on subjects with which they are not familiar. We wish to draw attention also to the way the *Radio Times* has publicised these talks. The writer of the back-handed blurb in that paper spoke both condescendingly and disparagingly of science and scientists. He even gave support to that outworn plea for a moratorium for research so that morality may have a chance to catch up with science, and he encouraged the altogether dangerous idea that scientific progress is largely concerned with the production of bigger and more beautiful bombs. We are surprised that none of the scientists who are speaking in the series has protested against this fatuous yet not innocuous write-up in the B.B.C.'s journal.

Electrolytic Chlorine, II

Some Mercury and Diaphragm Cell Types

by D. D. HOWAT, B.Sc., Ph.D., F.I.C., A.M.I.Chem.E.

(*Continued from* THE CHEMICAL AGE, *October* 16, 1943, *page* 384)

I. G. Farbenindustrie have patented a method of producing a vertically flowing mercury cathode for use in electrolytic mercury cells (B.P. 490,911). Such an improvement will permit the cells to be built in a much more compact form, with a marked reduction in floor space occupied.

A falling mercury cathode is subject to the tendency of the metal to break up into drops and separate streams so that maintenance of the whole of the cathode at a uniform electrical potential is no longer possible. Even when a metal backing-plate is provided the stream contracts away from the outer edges of the plate, with the evolution of hydrogen at these edges and the risk of formation of a dangerous explosive gaseous mixture. The patent provides devices which force the mercury to flow over the entire edge of a weir on to a vertically-disposed smooth guide surface coated with a metal that will readily form an amalgam. Fig. 6 shows the suggested design of a sheet metal guide the width of which progressively decreases in a downward direction in such a manner as to prevent the breaking up of the falling metal stream.

Another device consists of a guiding surface made by joining together two flat plates at the extreme edges by two semicircular end-plates so that any horizontal cross section through the surface presents closed lines of steady curvature. As indicated in Fig. 6, the mercury trough is formed at the top in the space between the plates, the metal overflowing smoothly along the entire top edge of the guide surface. This design claims to prevent any breaks in the falling stream of mercury. The arrangement of mercury feed pipe and electrode connections with the necessary insulation is shown in the figure. A mercury supply of 4 litres per minute per metre length of overflow crest is sufficient to carry a current density of 1200 amps./sq. metre over each of the two plane electrode surfaces. The small space required by this electrode in comparison with the horizontal cell is attested by the fact that an area of 2 sq. metres is required for a vat with 4 cathode surfaces, 5 anodes and a capacity of 14,000 to 20,000 amps.

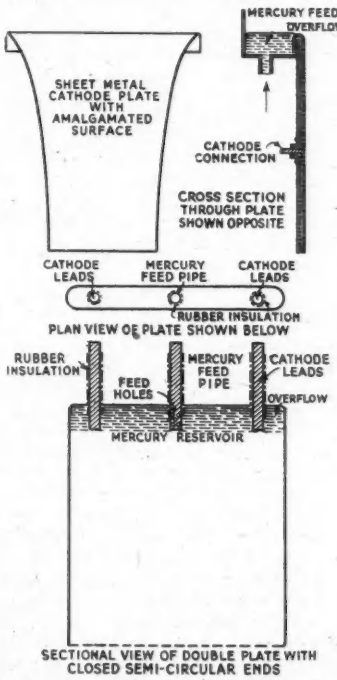


Fig. 6.—Arrangement of plant (I. G. Farbenindustrie) for production of a vertical cathode for use in mercury cells (B.P. 490,911).

A novel type of mercury cell incorporating some very unusual features has been proposed by H. N. Gilbert, of E. I. Du Pont de Nemours & Co. (U.S.P. 2,234,967). The essential feature of the cell is the production of a mercury cathode by the formation of a film of the liquid metal on a rotating wheel. The lower part of the wheel is suspended in a well containing mercury, the upper part being surrounded by a brine solu-

tion. As the wheel rotates it carries a surface film of mercury out of the well, bringing it into contact with the brine solution and returning it again to the well. As is evident from Fig. 7, the main body of the cell is made of concrete

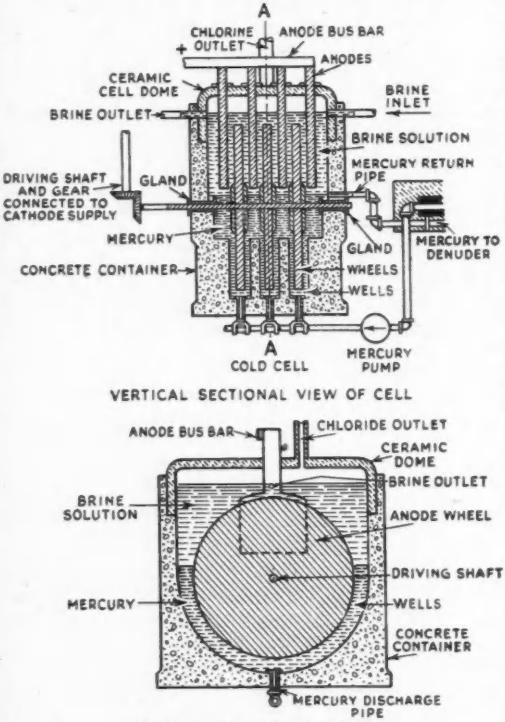


Fig. 7.—Rotary Wheel Mercury Cell: Above, vertical sectional view; below, section through A . . . A.

and equipped with three semicircular wells cast in the base. A single horizontal shaft carries three wheels, the lower parts of which are suspended in the wells, the wheels being made of monel metal, stainless steel, or other suitable material. The four graphite anodes are suspended through apertures in the dome of the cell and are placed on each side of the upper parts of the wheels. The dome of the cell, constructed of ceramic material resistant to chlorine attack, contains two pipes, inlet and outlet, for the brine solution, and a withdrawal pipe for the liberated chlorine. The wells and lower part of the cell are filled with mercury to a point a few inches above the centre of the wheels and a few inches below the bottom ends of the graphite anodes.

In the original patent specification the cell is intended to operate in conjunction with another cell of similar construction (known as the "hot cell") in which the sodium amalgam produced is electrolysed in a bath of fused salts with the production of sodium metal. This "hot cell" may be replaced by a simple type of denuder in which the amalgam is decomposed by distilled water with the formation of sodium hydroxide solution. To ensure thorough "wetting" of the rotating wheel surface with the mercury, small amounts of alkali metal must be present during starting-up periods. The minimum concentrations of alkali metal required to render possible 100 per cent. wetting of the different wheel materials are given by the inventor as follows:—

TABLE II.

Metal Surface.	Approximate minimum concentration of alkali metal in amalgam. Sodium per cent. by weight.	Potassium per cent. by weight.
Stainless steel	0.05	0.15
Monel metal	0.01	0.10
Carbon steel	0.01	0.05
Nickel	0.01	0.02

Failure of complete wetting will result in hydrogen liberation with consequent danger of explosion. Brine solution is circulated through the upper part of the cell, chlorine being liberated at the anodes and escaping through the off-take pipe. The sodium ions migrating to the cathode form an amalgam with the thin film of mercury on the wheel surface. As the wheel continues to rotate (usual speed 15/25 r.p.m.) this film is washed off into the body of mercury in the well and a fresh film forms. The dilute amalgam flows off through pipes in the base of the wells and is pumped through the "hot cell" or denuder. The greater part of the sodium is removed and the very dilute amalgam is recirculated through the electrolytic cell for a further cycle. Claims made for this cell are:

(a) A large surface of liquid electrode is exposed in relation to the size of the cell.

(b) High electrical efficiencies are obtained.

(c) Small amounts of liquid mercury are required.

(d) The plan area occupied by the cell is small.

Diaphragm Cells

Diaphragm cells with circulating electrolyte are the most widely used cells for chlorine production. For all purposes except the rayon industry the caustic produced under modern conditions is of sufficiently high grade to compete with that from the ammonia soda process. In the diaphragm cells chlorine is forced out on the anode, which is invariably constructed of graphite, and, rising through the solution, collects in the upper part of the cell and is withdrawn. The sodium ions migrating to the cathode percolate through the diaphragm and are discharged on the cathode with the formation of caustic. By maintaining the level of the anodic solution higher than that in the cathode section a positive flow from anode to cathode is ensured and the tendency to osmotic migration of hydroxyl ion is minimised. With increasing age the permeability of the diaphragm decreases and and osmotic movement increases, the anode solution becoming contaminated with cathodic products. The most undesirable feature under these conditions is the formation of hypochlorite in the anode compartment.

Perfect separation of anodic and cathodic solutions is obviously impossible and the dominant factor in diaphragm-cell design may be to make the separation of solution as complete as possible at the expense of other advantages, as in the free-diaphragm type; or to sacrifice separation of solutions in favour of better electrical conditions and compact arrangement, as in the submerged-diaphragm type.

The cells may therefore be subdivided into two groups:—

1. Those in which the diaphragm and cathode are completely submerged, so that both sides of the cathode are covered with electrolyte—the submerged-diaphragm type.

2. Those in which the electrolyte comes into contact with one face only of an unsubmerged diaphragm —the free-diaphragm type.

In a brief comparison of the two types of diaphragm cell the following advantages and disadvantages of each type may be noted:—

Advantages of the Submerged-Diaphragm Cells: (1) A more compact design of cell is made possible; (2) The electrical load that may be carried is greater; (3) Hydrostatic pressure is equal over practically the entire diaphragm area, ensuring even percolation of the solution throughout the diaphragm; (4) Deposition of impurities occurs evenly over the diaphragm; (5) Anode wear is more uniform.

Disadvantages of the Submerged-Diaphragm Cells: (1) With increasing age of the diaphragm osmotic pressure causes migration of the cathodic products into the anodic chamber, resulting in contamination of the brine solution; (2) Following on contamination of the anodic solution with caustic, hypochlorites form with, in extreme cases, production of acidity in the electrolyte and liberation of oxygen; (3) The quality of the caustic is not so high as with free diaphragm type.

Advantages of the Free-Diaphragm Cells: (1) The anode and cathode solutions are never in contact for any length of time, therefore osmosis does not occur; (2) Contamination of the anodic solutions is reduced to practically zero.

Disadvantages of the Free-Diaphragm Cells: (1) The cell design cannot be made compact; (2) The electrical load is smaller; (3) Deterioration of the diaphragm is not uniform.

Submerged-diaphragm Cells

Of this type of cell the most commonly known are the Hooker Type "S," the Townsend, and the Pimilio. Certain outstanding advances have been made in the latest Hooker cell which merit more detailed discussion. The most prominent feature of the Hooker Type "S" cell has been the employment of the deposited diaphragm, with the additional advantage that a compact rectangular cell, almost cubical in form, replaces the older narrow high cell with excessive radiation surface. As shown in Fig. 8,

the cell consists of three superimposed sections, the top and bottom sections being constructed of concrete. These two sections serve as containers for the

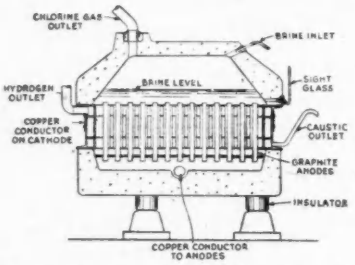


Fig. 8.—Hooker Type "S" Deposited Diaphragm Cell (MURRAY ET AL.).

brine and chlorine, electrolysis occurring in the active middle section. This central compartment consists of rows of graphite anode blocks alternating with asbestos covered wire screen cathode chambers. Inside this section, measuring only 5 ft. in length, 4 ft. 6 in. in width, and 1 ft. in height, is housed about 130 sq. ft. of active cathode surface and 110 sq. ft. of active anode surface, permitting satisfactory operation at the high current load of 7000 amps.

Since the diaphragm is formed by deposition under suction, the cathode section is highly compact, comprising a heavy wire screen carried within a channelled iron frame, 28 individual cathodes being incorporated in one frame. The arrangement provides rows of parallel cathode fingers projecting along two opposite sides and arranged to alternate with the graphite anode plates. The entire frame is lowered into a suspension of asbestos fibre in water. By coupling up the frame to a vacuum pump the water is sucked through the wire screen and a compact strong asbestos precipitate is deposited on the surface to form the diaphragm. One feature of the cell operation is to maintain the level of the cathode solution as near the top of the compartment as possible, leaving only a small space for the collection of the hydrogen. The claim is made that another important advantage of this cell is that renewals of diaphragm and anodes may be effected in one cell at a time, cutting out the cell in question from the circuit by a portable easily-connected jumper bar. In this way, although the voltage drop across individual cells may vary, the voltage drop across an established circuit of cells remains constant for a given amperage.

(To be concluded.)

Saving Coal

I.C.I. Engineer's Plan

A SUGGESTION that public electricity supply stations might conserve fuel by using some of the heat, now wasted to the cooling water, to provide heating for industrial and other purposes in the immediate neighbourhood of the supply station, was made by Mr. T. E. Houghton, new chairman of the Mersey and North Wales (Liverpool) centre of the Institution of Electrical Engineers, at the opening meeting of the session at the Royal Institution, Liverpool, last week. Mr. Houghton, power department manager and electrical engineer for Imperial Chemical Industries (General Chemicals), Ltd., said that the undoubted success of the many back pressure stations, both in this country and abroad, made one wonder why something on similar lines was not attempted by the public supply authorities. Most of the supply undertakings had a fairly large domestic load, and it seemed all wrong for the base load stations to waste a large fraction of the heat in the coal burned by throwing away low-grade heat to the cooling water. An appreciable proportion of the heat might be saved by supplying hot water or steam instead of electricity for heating.

Steam at a pressure of 100 lb. per sq. in., or alternatively high pressure hot water could be transmitted economically for distances of well over a mile, so that a central back pressure system working parallel with the "grid" could supply a fairly large urban area. He claimed that by such methods it would be possible to save some 2,500,000 tons of coal a year in this country, or 12 to 15 per cent. of the total peacetime consumption of electricity undertakings. Plants of this type were working satisfactorily in America, Germany and Russia. Mr. Houghton urged complete investigation of the matter, in view of the urgent necessity for conserving coal resources, and the high price of coal likely to rule in the future.

Aerial photographs taken by the R.A.F. show that three-quarters of the buildings in the Berlin electrochemical branch of Siemens were burnt to the ground as a result of the raids at the end of August.

Post-War Research Policy

Far-Reaching Improvements Advocated

A SCIENTIFIC research policy closely resembling that advocated by THE CHEMICAL AGE for many months past has been demanded by a sub-committee of the Parliamentary and Scientific Committee in a report on Scientific Research and the Universities in Post-War Britain. The report has been unanimously adopted by the main committee and has now been formally presented to the Lord President.

The urgency of the need for the report is exemplified by the following extract from it: "Britain cannot afford to fall behind other nations in this essential task of research, if only because of its density of population, and its position as the centre of a wide empire. If we are to maintain our position, we must take full advantage of the native ability of our scientists and engineers, and the intelligence and craftsmanship of our workers." Recommendations as to how this end can be attained make up the body of the report. Research and the application of scientific knowledge should be promoted on a far bolder and more imaginative scale after this war than in 1918, and there must be a proportional expansion of the supply of scientific personnel. This in turn calls for expansion at the universities and technical colleges, and the inculcation of scientific principles at all stages of education.

Demobilisation

As a first step, there should be an effective organisation of the demobilisation of the large number of scientific people now on war work or in the Services, to enable them to complete their training, and to guide them into positions where their previous training and their war experience will be of special value. The universities should prepare for a rapid growth in the number of students of science and technology. This will call for an expansion of existing universities, and possibly the development of some existing establishments into new universities. State Bursaries and Engineering Cadetships should be continued after the war is over and developed to cover sciences not hitherto included.

Materials and finance should be made available for the expansion of research schools in the universities. The number and value and scope of the post-graduate grants awarded by the D.S.I.R. also need to be considerably increased; more post-doctoral fellowships are also required. University staffs, stipends, and buildings should all be increased. A capital sum of £10,000,000 will be required for buildings and equipment spread over the first five post-war years, as well as adequate priority for the work and materials involved. The present annual Treasury grant to the universities of approximately £2,250,000 per annum should be increased to £6,000,000 or £7,000,000 per annum. The freedom, independence, and diversity of the universities should not be prejudiced in any circumstances, but to ensure the best use of the increased funds, and to avoid wasteful overlapping, they should set up a suitable Universities' Advisory Council.

Laboratory Training

There is a need for greater assistance to promising young people already engaged in industry to enable them to take full or part-time courses. Courses in "laboratory arts" should be instituted in order that there may be an adequate supply of properly trained laboratory technicians, and young people should be encouraged by the provision of grants to enrol in such courses. The status and remuneration of laboratory technicians require improvement. The supply and training of technical teachers requires urgent investigation.

Our industry, in order to raise our standard of living and to maintain our position among the nations, will have to concentrate increasingly on the manufacture of products which demand a special degree of intelligence and technical skill in the making. Science will have to be applied increasingly to ensure the best use and maximum yield of our soil, animals, forests, fisheries, and mines, the development of our colonies and protectorates, as well as the maintenance of health and the prevention and cure of disease.

In this country, it is stated, the problem of research and universities in many respects has been approached with less energy and foresight than in America or Russia, but there are now encouraging signs that we are beginning to appreciate the need to revise the scale of our efforts. We should certainly look forward to spending at least ten times as much annually after the war if we are to provide the basis without which neither our agriculture nor our industry can effectively meet the needs of the future.

Fabric coated with butyl rubber, claimed to be the finest mustard-gas repellent yet produced, is being made in Canada at the Barringham Rubber Company plant at Oakville, Ontario. The Canadian Navy has at present first claim on the new protective garments, the use of which is to be extended to the other armed forces.

Parliamentary Topics

Norwegian Nitrates

IN the House of Commons last week, Sir Archibald Southby asked the Parliamentary Secretary to the Ministry of Economic Warfare the estimated production of nitrates and other chemicals of the Norsk Hydroelektrisk Kvaelstoff A/S plants, and how much of this went to Sweden and Denmark and thence to Germany.

Mr. Dingle Foot replied that according to his information, these plants produced about 64,000 metric tons of nitrogen in 1941-42 and about 80,000 metric tons in 1942-43. By far the greater part of this production was probably used in the manufacture of fertilisers, chiefly nitrate of lime. These plants also produced nitrous oxide, carbon dioxide, and the rarer gases, namely argon, neon, xenon, and krypton. Exports to Sweden in 1941-42 were 100,000 tons of nitrate of lime and about 6000 tons of nitric acid, while exports to Denmark and Finland amounted to 178,000 tons of nitrate of lime and 28,000 tons of nitrate of lime respectively. He regretted that he had no corresponding figures of exports for 1942-43, but the proportions were probably similar. There were no re-exports from Sweden of either commodity, and it was unlikely that there were any re-exports from Denmark, though supplies consigned to Germany might have passed through Denmark.

Coal Utilisation

Revolutionary Changes Forecast

SPEAKING at Newcastle on Monday last, Mr. J. G. Bennett, director of the B.C.U.R.A., forecast uses for coal which, when they come into being, will not only revolutionise the coal industry, but will have an effect on the chemical industry which can as yet scarcely be estimated. When security permits publication of the results of British research into the uses of coal, said Mr. Bennett, it will be found that Britain is in this respect ahead of all other countries. We may see a lessened coal production used to greater advantage, sold at a higher price, and yielding better wages to miners. The transformation would come about by better application of scientific methods both to the nature of coal viewed as a chemical compound, and to the utilisation of coal as a source of energy. Among recent developments which Mr. Bennett cited as resulting from scientific research was a method of burning coal in grates which would give at least five times the intensity of present installations.

Referring to smoke abatement, Mr. Bennett pointed out that although the importance of the question had been realised for half a century, it was only within the last ten years that anyone really knew how much smoke a coal fire produced. The fact that a temperature of 600°C. is required to ignite the volatiles had been overlooked by those who had been trying, for 150 years, to improve the coal fire.

From the scientific hypothesis that coal is a colloid a whole range of further experiments and observations has been suggested. These are now being made, and they have had important practical consequences, including a suggestion for a new process of making plastics from coal.

The importance of improving the efficiency of coal-using equipment was particularly clear to-day. A 1 per cent. increase in efficiency over the present average of, say, 30 per cent., was equivalent to more than five million tons of coal a year, and a few per cent. increase in efficiency spelt the difference between plenty and dearth.

During the last few months, Mr. Bennett said, the B.C.U.R.A. laboratories had been visited by Dr. Schroeder, deputy-director of the U.S. Bureau of Mines and one of the leading authorities on fuel research in America. When he saw what we were doing on solid fuel combustion research, he declared that we were years ahead of anything that was being done in America.

LETTER TO THE EDITOR

Equality in Poverty

SIR,—This is really too much! What is all this about planning being the death of thingummyjig?

(a) It is a " proven fact " (who proved it, by the way?) that the State is, and always must be, the most cumbersome, expensive and dilatory agent to employ in any form of practical and constructive work.

(b) We all agree that in spite of these handicaps the State must be so employed when war's afoot.

Why do we all agree on this? Your readers are *scientists*, and I very strongly doubt whether a single one of them will agree with this phooey for a moment. If (a) is true then it is obvious that nobody, and least of all scientists, would reach the agreement stated in (b).

Finally, if I may be permitted the reminder, I should like to mention that the State with a capital S which we know as the Soviet Union did manage to get a little practical and constructive work done between 1920 or so and 1940, and so far as one can make out—of course, I only know what I read in the papers—they have not been so very cumbersome or dilatory during the last twelve months.—Yours faithfully,

NEIL R. FISK, Editor,
Paint Technology.

October 12, 1943.

The German Chemical Industry

After Four Years of War

From a Special Correspondent

CONSIDERING the process of concentration and rationalisation which has been applied to German industry during the past twelve months, it is surprising to note how little effect these far-reaching changes have had on the German chemical industry. The standardisation and rationalisation which so greatly affected the engineering industries has, in fact, left the chemical industry very much where it was before the war. The leaders of the chemical industry successfully argued that there was little scope for "mobilisation of surplus labour" and other economies in their industry because it differed, structurally and technically, from all other industries. The labour-output ratio had always been very low, mass production methods had always been used, and there was therefore little if any scope for economies of the usual type. These arguments proved successful, although in fact standardisation had not gone as far in the German chemical industry as in the chemical industries of other countries.

Cell-Wool Varieties

Before the war German dyestuffs manufacturers boasted that they made about 13,000 different types and shades of coal-tar dyes. Since then the number has been drastically reduced, but it still seems to be comparatively large. Cell-wool is now being made in 200 varieties, differing in raw material, structure, strength of thread, and other properties. This material is being used for many and various purposes, and many different types are therefore needed; but it can hardly be maintained that so many types are really necessary. The authorities have had recourse, in some branches of the chemical industry, to such measures as a "stop" on new products, analogous to the "wage stop" and "price stop" decreed in other sectors of German economy, but the actual reduction of types has made very little headway.

In this respect the control authorities seem to have been more successful in certain border trades of the chemical industry. In the manufacture of lacquers, printing inks, rubber products, leather polishes, candles, matches, pencils, etc., the number of articles made has been reduced. This was possible only because production in these trades is largely in the hands of small firms which employ a large amount of labour and have little influence with the higher authorities. These firms have found it very difficult to procure raw materials and were for this reason forced to accept severe restrictions on their production. The "mobilisation of labour" in these smaller establishments has had the result of concentrating production more and more in the hands of the bigger firms which make more use of machinery and automatic processes.

In the chemical industry proper, however, concentration had reached before the war a stage where further advances were hardly possible. The big synthetic plants for the manufacture of oil, rubber, plastics, etc., had been designed from the outset to save labour and to use fully automatic and mechanical processes wherever possible. In them mass production had reached a pitch where further advances would have impaired efficiency. These plants do not employ more but less skilled labour than other chemical factories. At the beginning of the war it was reported that only about 25 per cent. of all workers were skilled, 14 per cent. had received some sort of a training, and the rest were entirely unskilled. Wages accounted on an average for no more than 20 to 25 per cent. of the total costs of production, while depreciation of plant and equipment were a far higher item in the chemical industry's budget.

The By-Product Problem

There is equally little scope for economy in raw materials or for salvage and better utilisation of waste products. In the big plants great attention was always paid to "secondary products" and expensive installations were set up to work them up into a marketable form. Under present conditions these by-product plants have not all proved entirely satisfactory. Fuel and labour, which it was profitable in peacetime to employ on these secondary products, are now too valuable to be wasted on items of problematical value. On the other hand, the shortage of raw materials has grown so intense that all waste products must be utilised, even at a comparatively high cost in labour. The German chemists have therefore employed their ingenuity on the development of new outlets for previously neglected products. Little is known about the success of their work, but what is known suggests that most of the opportunities existing in this field had been used before the war.

As far as the organisation of the German chemical industry is concerned, two distinct tendencies may be noted. On the one hand, the big firms have extended their influence; existing price and marketing car-

tels have grown into production syndicates. Just as the I. G. Farbenindustrie A.G., formed in 1926, did not come into existence as a new enterprise, but emerged organically from the increasingly intimate co-operation of various chemical and dyestuffs manufacturers who finally decided that complete amalgamation was the logical and indeed inevitable sequel to the pooling of patents, markets and interests entered upon before, so also many smaller chemical combines have come into existence during the war, as the need for more intensive co-operation became increasingly apparent. Not only did technical factors favour this tendency, but political events also worked in that direction. Politically influential firms were able to extend their sphere of influence into occupied countries, to employ sub-contractors on work given to them by the Nazi Government, and to concentrate great industrial power in their hands.

State Control

On the other hand, Government control over the industry has also been growing. In 1937, an "Office for German Raw and Working Materials" ("working materials" being a euphemism for "substitutes") was set up, and this was followed in 1938 by the appointment of a "Commissioner-General for Special Problems of Chemical Production." Since then many chemists and industrialists have been requested to co-operate with these authorities in an honorary capacity on the so-called "Chemical Production Plan," and at the same time contact with chemical firms interested in the Four-Year Plan was intensified. All research work was unified under central direction, co-operation with makers of chemical apparatus was ensured, and lately special "Supply Boards" have been set up in certain trades where existing forms of organisation were apparently found wanting. Thus there is a Supply Board for generators, another one for distillation plant, and so on. More recently, the authorities have stimulated the formation of committees for "autonomous administration" of various industries, in which producers and buyers of certain apparatus and products co-operated. In practice, the buyers tell the producers what they need, and the producers decide among themselves how this particular demand is to be met. This co-operation in special committees is said to work quite satisfactorily. It has certainly accentuated the co-operative tendencies in German industry.

Those industrialists who occupy influential positions in these and other committees, etc., have naturally great power, not only over their own firms, but over their trades and competitors. The result has been the emergence of a new class of powerful industrialists who rule their industries under the formal control of Government officials, but who are actually very much left to themselves. The firms of these men have in fact greatly benefited from the concentration of power in the hands of a powerful few. Even they, however, suffer from certain unavoidable drawbacks which have more recently seriously reduced the efficiency of the German chemical industry: air-raid damage, depreciation owing to neglect of normal repairs, shortage of important construction materials, impossibility of replacing valuable apparatus and instruments, shortage of containers, exhaustion of reserve stocks, and lack of new recruits for the chemical industry, both among chemists and among skilled workmen—all these factors tend to reduce the efficiency of the chemical industry. Nevertheless, it would be a mistake to assume that German chemical production is declining on the whole front. Until recently many chemical manufacturers were able to point out in their annual reports that their production had increased, though at the same time reference was made to shortage of labour and raw materials and to difficulties arising out of damage to and obsolescence of plant.

Reduced Production

As far as the output of synthetic oils, fats, textiles, plastics, and rubber is concerned, no further advances have been made during the past year. Production figures seem, indeed, to have declined materially, but this is at least partly due to a deliberate policy on the part of the authorities who favour certain processes to the detriment of others and must marshal their supplies of raw materials carefully. Coal and coal derivatives are the common starting material of many of these plants and cannot be made available for all of them in unlimited quantities. The responsibility for consequent falls in production, however, rests with the control authorities.

The German chemical industry has proved its efficiency again in this war, and it may be assumed that as a result of war experience it will tend to increase rather than curtail its interest in subsidiary and ancillary trades. Large chemical companies with their own coal and lignite mines are likely to increase their interests in these industries; cell-wool producers are actively participating in wood and pulp production; magnesium and aluminium producers are exploiting magnesite and bauxite mines on their own account, and other cases of this kind can be quoted. They are likely to increase in importance in the future.

The Montecatini chemical factory and the Ilva steel works at Bagnoli, near Naples, were blown up by the retreating Germans, reported a Reuter correspondent last week.

Mine-Dust Analysis

New Method of CO_2 Determination

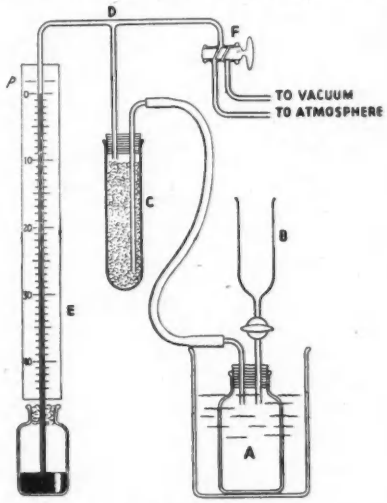
IN a memorandum on methods of analysis issued as part of M. and Q. Form No. 128, "Precautions against Coal Dust" (1939), suitable methods of determining carbon dioxide in mine-dust samples are described. A new method, described in the Fourth Report of the General Research Committee of the Monmouthshire and South Wales Coal Owners' Association, has now been tested in the Safety in Mines Research Board laboratories and in the Mining Equipment Testing Station of the Ministry of Fuel and Power. The method has proved suitable for its purpose, within certain limits and with certain safeguards, and the principle underlying it has been approved.

The new method enables the weight of carbon dioxide to be determined from the increase in pressure when a weighed quantity of the sieved dust is treated with dilute hydrochloric acid in an enclosed and partially evacuated vessel of constant volume maintained at a constant temperature. If a constant weight of dust is used and the temperature remains constant, the increase in pressure due to the liberation of carbon dioxide is directly proportional to the percentage of carbon dioxide in the mine dust, and the pressure gauge can be calibrated to read directly the percentage of carbon dioxide. The reading needs no correction for atmospheric pressure, so long as each experiment is completed under constant atmospheric pressure.

A simple form of apparatus is shown in the figure. A is a reaction bottle fitted with a dropping funnel, B, and a leading tube connected by stout rubber tubing to a drying tube, C, and a T-piece, D, with connections to a mercury manometer, E, and a 3-way tap, F, which makes connection with either the atmosphere or a vacuum pump. (A simple water Sprengel pump has proved adequate.) The bottle, A, of about 200 ml. capacity, is immersed in water in order to keep its temperature constant. The manometer tube is about 18 in. by ¼ in.

A mixture of equal volumes of water and concentrated hydrochloric acid is made, and 2 per cent. of Perminal is added to the mixture in order to make sure that the dust under test is thoroughly wetted and all the carbonate decomposed.

The manometer is fitted with a scale to read percentages of carbon dioxide, in the following manner. First, an arbitrary point, *p*, near the top of the manometer tube is marked and the mercury is then brought by suction to this point. Tap F is then closed. Ten ml. of the acid mixture are dropped into the bottle A. This causes the level of the mercury in the manometer to fall correspondingly, and the new level is marked as the zero of the scale. The bottle is cleaned and replaced, 0.500 gm. of pure calcium carbonate is placed in it, it is evacuated until the mercury in the manometer reaches the point *p*, 10 c.c. of acid



are run in, and the flask is shaken. When the evolution of gas is complete the new level of the mercury is marked as 44 per cent., the amount of carbon dioxide in calcium carbonate. The scale is then divided evenly into 44 parts. The calibration can be checked, if desired.

The determination of CO_2 in samples is carried out in the same way, using the same weight (0.500 gm.) of mine dust as was used for the calibration. The reaction is complete almost as soon as the acid and dust have been shaken together if the carbonate present is calcium carbonate. Magnesian limestone, commonly used in certain coalfields as the incombustible dust, and some other carbonates react more slowly than ordinary limestone (calcium carbonate). In such cases the reacting mixture must be frequently shaken until the manometer reading is constant. Alternatively, the reaction vessel may be heated nearly to the boiling point and then cooled to its original temperature; if this is to be done the bottle should be replaced by a flask, and suitable means adopted to prevent loss of air and gas through the manometer.

Chemicals in South Africa

Important Enamel Developments

From our Cape Town Correspondent

SOUTH AFRICAN manufacturers are still adding to the range of chemical products made locally as the import difficulties continue to increase. Soluble cutting fluid is being made in Jeppe, Transvaal, by a new factory, which is also producing synthetic red roof paint. It is planned shortly to begin the manufacture of white lead.

A development in enamel processing of great interest is reflected in the recent patent of Mr. F. J. Gill, director of a Durban firm, and is the result of many months' experimental work. The process embodies the mixing of vermiculite with enamel to obtain an attractive granular-finish effect. By means of special baking formulæ the enamel can be prepared in coloured pastel shade finishes. Hitherto most enamel finishes have been in one or two straight colours. The finish is non-oxidising, and on the many signs and iron tiles recently treated the result is attractive.

New Polishes

A considerable amount of polish of different sorts is now manufactured, the leaders in this line being branches of famous British factories, and boot and shoe, floor, and furniture polishes famous in Great Britain are now being made to the same standards in South African factories. At the same time new South African companies are also being floated to turn out similar products. These also adopt branded names which it is hoped will presently become household words. A new Johannesburg company producing step and floor polishes is also making scouring soap, silverware soap, metal polish, white shoe dressing and laundry blue. Some of these manufacturers are now creating a demand for their products by a vigorous advertising campaign. A firm previously making cooking oils has established a division for the manufacture of toilet and household soaps, polishes and chemicals. A new manufacturing concern in Pretoria is producing products for cleaning windows, white and khaki shoes, baths, basins, etc. Stove polish is another line produced on increasing scale in South Africa. Protection for polished surfaces is given by a new material made in South Africa. It can be applied by spray, brush, dip, or roller, and is also suitable for use on ceramic parts. It dries to a flexible, transparent film in 6-8 min. at 90° C. Thus, coated parts can be inspected and the film easily removed when necessary by peeling or blowing off with an air valve after one corner has been loosened. The removed material can be re-used after being reduced to liquid form.

With the need to serve a big mining industry, the South African explosives industry has always worked on a large scale, but since the war there has been a vast increase in output, as a large percentage of the South African explosives output has gone into locally produced munitions of war. Allied chemical industries have thus found themselves in a better position to export to neighbouring territories, and this trade would have reached a high level but for the rigid system of Government control. Many million carbon cells are produced annually in local factories. Generally this output is much in excess of local consumption and some of it has been sent to other African countries.

The news given to the nutritional problems of Nazi-dominated Europe and the scarcity of certain familiar products in South Africa seems to have stimulated the production of certain new preparations and beverages by local manufacturers, who are " playing up " the vitamin content of their new lines. One of these, called " Vitamite," is a yeast and vegetable extract claimed to be rich in vitamin B_1.

The Salt Problem

Recently salt has been a big problem in South Africa. Imports have been reduced and at the same time there has been a huge increase in the industrial and domestic demand. Unfortunately, local output has not been up to standard and some of the larger producers have produced so much less than usual that customers have had to be rationed. Most of the salt now used in South Africa is of local production, but only a few producers are introducing improved methods of overcoming the formation of scale and providing proper running water in their plants. As a rule in South Africa the brine is evaporated at a reduced pressure by out-of-date methods. Solar evaporation is preferred by most producers.

Tung oil production is increasing in importance. It is estimated by the Tung Growers' Association that the 130,000 trees in the country will yield 275 tons in 1943. As the oil is now being sold at £295 per ton the returns will be satisfactory. It is 20 years since the first tung trees were grown in South Africa, and during the last 15 years there has been rapid development Tung nut research is carried on at the Government horticultural station in Nelspruit, Northern Transvaal.

New British Standards

Water-Tube Boilers

THE range of published British Standards for Boilers has been completed by the issue of a British Standard Specification for Water-Tube Boilers and their Integral Superheaters (B.S.S. 1113). This specification applies to water-tube boiler units including superheaters, economisers, and to other parts connected to the boiler without the interposition of a shut-off valve which is exclusive of brickwork setting and insulation. Details of material specifications are included, covering plates and rivet bars, seamless forged drums, forgings other than seamless drums, tubes and headers, pipes and steel castings. Complete formulæ are included governing the scantlings of the boiler, and these formulæ apply to boilers working under average normal conditions of draught, good feed water and adequate supervision.

Where working conditions are adverse, *e.g.*, abnormal evaporation, bad feed water, exposure to the elements, or where of necessity maintenance supervision will be inadequate, it is recommended that the scantlings found by calculation from the formulæ given should be increased. The simplest method of compensation for adverse conditions of the kind is to design for a working pressure above that at which it is intended to operate the boiler, having regard to the probable reduction of life in service due to the adverse causes.

It has been the general desire to avoid the use of complicated formulæ, and this has been possible by confining consideration to the standard types of water-tube boilers in general use. It is realised that some of the formulæ adopted could not be applied to all conceivable combinations and variations in design which progress might dictate and in such cases the scantlings should be the subject of agreement between the purchaser and the manufacturer. It is recognised that the design of water-tube boilers is the subject of continuous development, and it is intended to review this specification annually with a view to the incorporation of such modifications as are found desirable as a result of progress.

Copies of this Standard may be obtained from the B.S.I., 28 Victoria Street, S.W.1, price 7s. 6d. post free.

Camouflage Paint

The British Standards Institution has just issued B.S. 1128: War Emergency Recommendations for Primers for Camouflage Paints for asbestos cement, concrete cement, cement bricks, and sand-lime bricks. The preparation of these recommendations was undertaken to augment the information given in the camouflage paint specification B.S. 987, and its accompanying Surfaces Chart, with special reference to the difficulties associated with the painting of asbestos-cement, concrete, and similar surfaces. The recommendations relate essentially to primers for use with oil-bound water paint, bituminous emulsion paint and wool-grease emulsion paint. Part 1 deals with the recommended primers. Part 2 gives notes on the primers, and it is pointed out that these notes are intended only as a description of the material and not as a specification. Part 3 relates to notes on application of the primer. It is pointed out in the introductory paragraph to these notes that paint carelessly applied, and particularly camouflage paint, is a waste of labour and material and is a national loss, and that satisfactory results cannot be obtained if the essential conditions set out in the notes are not observed in all respects. Copies of this specification are obtainable on application to the B.S.I., 28 Victoria Street, London, S.W.1.

LACTIC ACID STUDIED

The pyrolysis of lactic acid derivatives was dealt with in a paper presented to the Pittsburgh meeting of the American Chemical Society by E. M. Filachione, J. H. Lengel and C. H. Fisher. Methyl, benzyl, and tetrahydrofurfuryl esters of alpha-acetoxypropionic acid when pyrolysed decompose into the corresponding acrylic esters and acetic acid. The preparation of ethyl acrylate and similar alkyl acrylates by the pyrolysis of appropriate esters of acetoxypropionic acid is less satisfactory because of a side reaction that produces an olefine, acetaldehyde, and carbon monoxide.

(Pyrolysis)

$$CH_3COOCH(CH_3)COOH \longrightarrow CH_2COOH + CH_2 : CHCOOH$$

$$CH_3COOCH(CH_3)COOCH_2CH_3 \longrightarrow CH_2COOCH(CH_3)COOH + CH_2 : CH_2$$

$$CH_3COOCH(CH_3)COOH \longrightarrow CH_2COOH + CH_3CHO + CO.$$

Because it was expected that phenyl and substituted phenyl alpha-acetoxypropionates would decompose satisfactorily into phenyl and substituted phenyl acrylates, the preparation and pyrolysis of the phenyl and *o*-tolyl esters were studied. The phenyl esters were prepared by the (1) production from lactic acid and acetic acid of acetoxypropionic acid, followed by (2) the conversion of that substance into acetoxypropionyl chloride, and (3) reaction of acetoxypropionyl chloride with phenol or cresol. Pyrolysis of phenyl and *o*-tolyl acetoxypropionate gave the corresponding acrylic esters in yields of 75 to 80 per cent. The polymers prepared from phenyl and *o*-tolyl acrylate were relatively hard at room temperature.

Leather Trades Chemists

Papers at the Manchester Meeting

TWO interesting papers were presented at a meeting of the Manchester Group of the British Section of the I.S.L.T.C. held recently. Mr. W. R. Atkin, acting president, spoke on "The Effect of the Structure of the Hide on Vegetable Tanning." In discussing the classification of the tannins, he showed that valonia and probably all those tannins which deposit bloom contain one free carboxyl group. He then demonstrated the behaviour of gelatin in acid solutions by means of lantern slides. In suspender liquors, the degree of plumping is determined by the *p*H, the nature of the acids present, and the salt concentration. With gelatin solutions, monobasic acids such as hydrochloric have double the swelling power of dibasic acids such as sulphuric. This is not apparent in tanyard liquors except on the addition of more than enough sulphuric acid to regenerate the natural acids which have been neutralised by lime. Small amounts of calcium salts increase the plumping action of acids but sodium sulphate has the reverse effect. The degree of tannage increases with the degree of plumping.

This was followed by Mr. S. Wolstenholme's paper on "Laboratory Tests Applicable in a Chrome Upper Leather Factory," in which he outlined the methods of analysing the chrome tanners' raw materials. By means of titration curves, he showed how the ratio of sodium sulphide to sodium hydrosulphide could be determined. Finely-ground lime can be analysed by dissolving in 10 per cent. sucrose, filtering, and titrating. Finally, he demonstrated a water-penetration testing apparatus for chrome upper leather in which it is constantly flexed and a bell is rung when penetration takes place.

Applied Photography

New Data Sheets by Kodak

THE latest issue of sheets for the Kodak Data Book includes new revised editions of three of the earlier sheets: D8, Silver Photo-Lithography; Y1, The Selection of "Wratten" Filters for Photographic Purposes; and Y3, Table of Recommended Safe-Lights for Dark-Room Illumination. The two last of these were originally combined on one sheet. Y1 has been completely rewritten, and is now descriptive rather than tabular. There has been a considerable extension to Y3, making it a very comprehensive guide to the safe-light which should be used in any circumstances. Since the Kodak I. R. 30 Infra-Red Process Plate has been discontinued, Sheet X17, which dealt with the characteristics of this plate, is now obsolete.

Eight new sheets are also available. The eight-page booklet, A34, deals with the Radiography of Welds. The types of fault to be expected in welds, and how these may be detected, is dealt with in detail, and there is a series of 27 literature references. The planning and production of technical instructional films is described in the six-page booklet B1, Technical Sub-Standard Motion Pictures. In addition to discussion of the normal problems of the photographic aspect, some useful notes are added on the editing of such films.

Data Sheet C4 deals with Liquid Filters for the Isolation of Certain Lines of the Mercury Discharge Lamp. A list of stock solutions for this purpose is followed by the combinations and quantities of these required to isolate the various mercury lines over the region 5700-2537 A.U.

An Ultra-Speed X-Ray film is described in X40. The eight-page booklet X41 describes the nature and use of transfer sensitising paper by which metal, plastic, or other surfaces may be sensitised so that they will receive a photographic image.

The characteristics of available filters for infra-red work are given on Y28, together with the types of plates recommended for the different infra-red regions. Ten tables giving data on Cine-"Kodak" (16 mm.) equipment—shutter speeds, depth of field, etc.—are combined in Y29. The percentage transmissions of various filters and combinations of filters designed to give "monochromatic transmission" over the region 4200-6500 A.U. are arranged in tabular form in Y30.

SWEDISH SACCHARIN

There has been a fourfold increase in Swedish saccharin production since the war began. The country's peace-time output amounted to 20 tons per annum. To-day, the Nobelkrut saccharin factory is fully employed. The raw material is obtained by chloramine synthesis, the latter also providing raw material for disinfectants. It is claimed that the Swedish saccharin is very pure and cheaper than imported products, so that it will have good prospects in the export market after the war. Bofors reports that the production of acetanilide from benzol has increased fivefold since the establishment of their new factory; the output is being sold to pharmaceutical factories for the manufacture of sulphonamide preparations. Another Nobelkrut product which has increased in importance is nitrocellulose for the manufacture of lacquers, its output having trebled since the beginning of the war. It is used for the production of paints and varnish, American cloth, and a kind of linoleum.

Personal Notes

MR. WILLIAM MABBETT, a shift charge hand at the I.C.I. works, at Clydach, Swansea, was awarded the B.E.M. last week.

DR. W. H. COATES, a director of I.C.I., Ltd., is a member of the party which is to visit America to discuss post-war trade problems with representatives of the U.S. Chamber of Commerce.

PROFESSOR C. W. BICCARD JEPPE, M.Sc., A.R.S.M., D.I.C., has been elected president of the Chemical, Metallurgical and Mining Society of South Africa for the session 1943-44. He is a gold-medallist of the Institute of Mining and Metallurgy.

MR. N. WILLSMER, who for the past six years has been station engineer at the Nine Elms Works of The Gas Light & Coke Company, has been appointed deputy chief engineer to the company in succession to MR. J. S. THORMAN, who is retiring shortly.

PROFESSOR J. P. KENDALL, M.A., D.Sc., F.R.S.† Professor of Chemistry at the University of Edinburgh (and formerly at Columbia University), and general secretary of the Royal Society of Edinburgh, has accepted an invitation to join the board of the Scottish and Dominions Trust, Ltd.

Obituary

MR. EDWARD HERBERT CLIFFORD, whose death at the age of 67 has been announced, was president of the Institution of Mining and Metallurgy in 1941 and was a member of the Non-Ferrous Metallic Ores Committee of the Ministry of Supply. Specially distinguished as a mining engineer, he was on the board of several South African mining companies.

From South Africa is reported the death, at the age of 59, of MR. ERNEST H. A. JOSEPH, A.R.S.M., M.Inst, M.M., who was president of the Chemical, Metallurgical and Mining Society of South Africa in 1939-40. At the time of his death (on August 22) he had held the position of Deputy Government Mining Engineer for 5½ years, and in that capacity he had interested himself particularly in the prevention of silicosis.

DR. WILLIAM HERBERT HATFIELD, D.Met., F.R.S., technical research director of Thomas Firth and John Brown, Ltd., and a director of Firth-Vickers Stainless Steel, Ltd., died at Sheffield on October 17, at the age of 61. All his working life had been associated with the metallurgical interests of Sheffield: he was educated at Sheffield University, and gained his first industrial experience at Bessemers' works in that city. He won the Bessemer Gold Medal in 1933, and was elected F.R.S. in 1935. He was a vice-president of the Iron and Steel Institute and a member of the Iron and Steel Research Council. Dr. Hatfield's presidential address to the Sheffield Society of Engineers and Metallurgists was postponed from Saturday on account of his illness, and he died only a few hours before he was due to have taken part in a broadcast entitled "Made in Sheffield."

Dr. W. H. Hatfield

Institute of Export

New Course of Lectures

THE Institute of Export has given practical effect, by means of its recently-issued syllabus of study, to its view that a proven standard of knowledge is as essential in relation to export trade as, for example, in banking, insurance, accountancy, or the scientific professions.

Classes have already been arranged in London and Birmingham. As a further contribution to this important subject the Institute has arranged a series of lunch-time lectures, to be given in the Merchants' Hall, St. Mary Axe, E.C.3, on Mondays, Tuesdays and Thursdays during November and December, which should provide valuable information to young students, and serve also as "refresher courses" for the more advanced. The lecturers will be Mr. E. F. Stevens, Mr. James A. Dunnage, and Mr. W. W. Syrett. Book prizes are to be awarded on the results of an optional examination that can be taken by anyone attending at least eighteen of the lectures. Admission will be by course ticket only, application for which must be made before October 26 to the Secretary, Institute of Export, Royal Empire Society Buildings, London, W.C.2.

General News

The United Coke & Chemicals Co., Ltd. (Sales Dept.) have moved from 285 Glossop Road, Sheffield 10, to 34 Collegiate Crescent, Sheffield 10.

From their Cadby Hall centre alone, Messrs. J. Lyons & Co., Ltd., despatched 1250 tons of waste paper and board for salvage during 1942.

The South Midland section of the Institution of Electrical Engineers was inaugurated at Birmingham on October 16 by Colonel Sir Stanley Angwin, president of the Institution.

A film to demonstrate the Brownian movement has been made by two Glasgow scientists, using a solution of colloidal silver with an extra strong oblique beam of light concentrated on the particles.

Substitute agricultural limes from paper mills, and from the Prestonhall (Fife) plant of the British Sugar Corporation, Ltd., have been distributed to Scottish farmers at very cheap rates—as low as 1s. 3d. per ton ex factory—and with special cartage concessions. Local farmers have found this by-product lime a not unsatisfactory substitute for the natural product.

The British Standards Institution has just published a war emergency amendment to B.S. .138-1935, Portable Chemical Fire Extinguishers. This amendment provides for the use of steel in place of brass in the manufacture of the acid bottle cage. Copies of the amendment slip may be obtained free of charge from the Institution, 28 Victoria Street, London, S.W.1.

Derbyshire fluorspar producers, at a preliminary meeting last month, decided to form an association, entitled the Derbyshire Fluorspar Producers' Association, in order to be able to approach, as a body, the Government departments with which they are concerned. The first meeting of the new association will be held at the Rutland Hotel, Bakewell, on October 25, when future policy will be discussed and officers appointed.

Foreign News

Butadiene imports into Canada for industrial purposes are now duty free, and also exempt from the ad valorem war exchange tax of 10 per cent.

The Du Pont Company has developed a new method for "doping" plane fabrics. Usually the fabric is stretched taut over the frame, and the lacquer applied by brush or gun. The new method, involving the use of a special lacquer, permits the fabric to be treated before being sent to the aeroplane factory and its use allows scarce solvents to be reclaimed.

From Week to Week

Pyrethrum powder output of Chile last year was 40,000 kg. The figure of 200,000 is aimed at for next harvest.

An oily solution of pure crystallised vitamin D_3 is being sold in Germany under the name of Trivitan, it is stated.

The Brazilian Office of Co-ordination has assumed control over all metallic materials, both ferrous and non-ferrous.

Swedish chemical exports last year amounted to only 45 per cent. of their pre-war value. The principal items were explosives and matches.

In the first half of 1943, United States production of native sulphur was 25 per cent. lower than in the corresponding period of 1942, being 1,329,222 long tons as against 1,778,269.

The Japanese Camphor Production Co., which started its operations in July, now comprises 28 branches and 853 camphor refineries. Its initial capital was reported to be 3,000,000 yen.

Linseed oil as fuel is being used in Argentine factories. The Government has informed farmers that there is a possibility of 1,000,000 tons of this oil being converted into fuel oil next year.

A company entitled Keramchemie Gesellschaft für Säureschutz m.b.H. has been formed at Vienna to specialise in the manufacture of materials for the protection of chemical plant, etc., against corrosion.

The Egyptian Government is to develop the desert area along the coast of the Red Sea south of Suez, which is said to be rich in gold, lead, manganese, copper, iron, phosphates, and oil.

A more liberal policy for licences on patents seized from enemy owners has been announced by the U.S. Alien Property Custodian. The fee for a licence to use enemy-owned patents held by the Custodian is now $15 per patent, instead of $50.

A calcium-carbide plant has been added to Mexico's growing list of new industrial units. Owned and operated by a company called Carburo, S.A., the plant is located at Guadalajara, capital of the state of Jalisco. It has a daily capacity of 15 tons.

Speaking in favour of the Technological Mobilisation Bill, before the Senate Military Advisory Committee, Mr. Henry Wallace, U.S. Vice-President, urged the establishment of a central federal technical authority, and issued a warning against the shackling of free enterprise by allowing research to be dominated by a small number of large corporations and cartels.

The first samples of nitrate extracted from Caraveli, Peru, have reached Lima. They are of excellent quality, according to Reuter's Lima correspondent. The installation of machinery and the construction of a road is now under way.

A lubricating oil prepared from pine roots is now being sold in Sweden. While inferior to mineral lubricating oils in durability, it is reported to be quite satisfactory for certain purposes, including blending, but it is rather expensive to manufacture.

The French chemical combine, Air Liquide, reports a decline in gross profit from 97.3 to 33.6 million francs for 1942, due to the unsatisfactory financial results of many subsidiaries in other countries. The dividend is reduced from 12 to 8½ per cent.

I.G. Kontor Riga G.m.b.H., Riga, a new company with a capital of RM 50,000, is to sell the products and look after the interests of a number of German chemical firms, including I.G. Farbenindustrie A.G., in Estonia, Latvia and Lithuania.

The rare disaccharide, trehalose, has been found by J. Leibowitz, of the Hebrew University, Jerusalem, in specimens of manna collected from the North Iraqian desert, where it is used by the Bedouins as a sugar substitute in coffee. The discovery is reported in *Nature* (1943, *152*, p. 414).

The substitution of glycerine by propylene glycol for U.S. National Formulary preparations is now under consideration, reports the *Journal of the American Pharmaceutical Association* (1943, *4*, 194). In the same issue is given a summary of information on the use of this solvent.

A new artificial fibre on the German market is a mixture of flax or hemp tow and cellwool, which can be dyed with the usual cotton dyes, but seems to present certain difficulties in bleaching. The new material is also being used for bagging, sometimes in 50 : 50 mixtures with linen bast.

The sales of potash salts of American manufacture during the production year from June 1, 1942, to May 31, 1943, totalled 690,480 tons of K_2O. This is the highest output in the history of the American potash industry, and is more than double that of 1938. Over 90 per cent. of the potash sold was for agricultural purposes.

A sulphonamide dusting powder known by the trade name of Sufortan is being marketed in Germany. Its ingredients are sulphapyridine (20 per cent.), urea (30 per cent.), and a urea-formaldehyde compound (10 per cent.), talc and starch forming the base. The Germans claim that the preparation has a three-fold action, the sulphonamide acting prophylactically, the urea assisting the healing by removing dead tissue, and the formaldehyde effecting a bactericidal action.

New chemical factories projected in Spain include a plant for producing 100,000 kg. of citric acid per annum in Seville (Hijos de Luca de Tena); a cyanamide factory at Santander (20,000 tons per annum; M. D. Reynals); and a sodium silicate works at Valencia (360 tons per annum; E. G. Cucarella).

A factory to produce paints, oils, polishes, waxes and similar products is now being set up in the Purapura section of La Paz, Bolivia, reports the newspaper Ultima Hora of that city. Under the name of Bartuloc y Tonell, this new business is being equipped with machinery and equipment from the United States.

A new firelighter marketed in Germany is made from lignin components obtained from lignite. These are shredded to form a material resembling cotton wool, then lightly compressed and dried, mixed with sulphite cellulose lyes, and heated to 300°-500° C. to yield a smokeless product. The material is being sold in the form of sheets, rolls and boards and can be impregnated with naphthalene or paraffin.

Differences between natural rubber and synthetic material were demonstrated recently with the aid of the electron microscope in the new research laboratory of the Goodyear Tyre & Rubber Company in Akron, Ohio. This instrument reveals that synthetic latex consists of particles of smaller average size and greater uniformity. In natural rubber latex, the average size of a particle is 10 millionths of an inch; in synthetic latex it is 2.5 millionths of an inch. On the other hand, the range of the synthetic particles is only from 0.8 to 7.2 millionths of an inch, as compared with a 4-160 millionths range for natural rubber.

Forthcoming Events

The London section of the **Electrodepositors' Technical Society** will meet at the Northampton Polytechnic, E.C.1, at 6 p.m., on **October 25,** to hear a paper by N. A. Tope on "Zinc Plating from Sodium Zincate Solutions."

The Manchester Section of the **Oil and Colour Chemists' Association** meets at the Engineers' Club, Albert Square, on **October 28,** at 2 p.m., to hear a lecture by Dr. W. J. S. Naunton on "Molecules Without Tears," dealing with the present position of the science of high polymers.

The annual general meeting of the Manchester section of the **Royal Institute of Chemistry** will be held on **October 28,** at 6.30 p.m., in the Engineers' Club, Albert Square, and will be followed by a presidential address by Professor A. Findlay on "The Institute and the Post-War World."

At the meeting of the **Society of Chemical Industry** (London section), in the Chemical Society's Rooms, Burlington House, W.1, on **November 1,** at 2.30 p.m., Dr. S. Judd Lewis will present a paper on " Spectrofluorescence: A General Survey, with special reference to the Sugars."

The Leeds area section of the **Institute of Chemistry** and the **Leeds University Chemical Society** are holding a joint meeting on **November 1,** at 6.30 p.m., in the chemistry lecture theatre of the university. Dr. A. D. Mitchell will speak on " Lecture Demonstration of Improved Methods in Volumetric Analysis."

At the Birmingham meeting of the **Electrodepositors' Technical Society,** to be held in the James Watt Memorial Institute, Great Charles Street, at 5 p.m., on **November 2,** Dr. D. D. Howat will present a paper on " Some Applications of Chromium Plating in Ordnance Manufacture."

A symposium on "Rubber-like Plastics and Their Applications " will be held at the joint meeting of the **Society of Chemical Industry (Plastics Group),** the **Institution of the Rubber Industry** and the **Institute of the Plastics Industry** that takes place in the lecture theatre of the Institution of Electrical Engineers, Savoy Place, London, W.C.2, on **November 2.** The meeting starts at 2.15 and ends at 6.30 p.m. Speakers will include Dr. W. J. S. Naunton, Dr. H. Barron, Mr. H. Rogers, and Mr. A. Ryan.

At the first meeting of the new session of the **Royal Society of Arts,** at 1.45 p.m. on **November 3,** the president, Dr. E. F. Armstrong, F.R.S., will speak on " The Long Road of Progress."

The **London Scientific Film Society** is holding a film show at the Imperial Institute Theatre, Exhibition Road, S.W.7, at 5 p.m., on **November 6.** On the programme is the Russian picture " Coal," which includes shots showing underground gasification.

A conference on " Problems in the Utilisation of Small Coals " has been arranged by the B.C.U.R.A. for **November 10 and 11,** and will be held at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1. Further details can be obtained from the Conference Secretary, B.C.U.R.A., Rickett Street, London, S.W.6.

Company News

Greeff Chemicals (Holdings), Ltd., are paying an interim dividend of 3 per cent. (same).

Sadler & Co., Ltd., have announced an unchanged dividend of 5 per cent. for the year to June 30 last. Net profit was £3699 (£3131).

The Yorkshire Dyeing and Proofing Co., Ltd., has declared a dividend of 7½ per cent. for the year ended June 30, as against 3 per cent. for 1941-42.

Erinoid, Ltd., announce an ordinary dividend of 10 per cent. (same) for the year ended July 31. Trading profit is £122,940 (£106,685) and net profit £15,974 (£25,526), taxation reserve having risen again from £66,387 to £95,306.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH ALUMINIUM CO., LTD., Shrewsbury. (M., 23/10/43.)—September 30, disposition by Halifax Building Society, with consent of Jno. O. Smith and the company, also a disposition by Miss M. G. Dunlop, with consent of the company granted in implement of a trust deed dated September 12, 1934; charged on 8 Slamannan Road, Falkirk, and Milton House, Polmont, respectively. *£3,312,318. April 13, 1943.

BRITISH CELANESE, LTD., Torquay. (M., 23/10/43.)—October 2, trust deed dated September 20, 1943, securing £3,000,000 (not ex.) 4 per cent. first debenture stock together with premium of 5 per cent. payable in certain events, present issue £2,572,761; charged on lands, buildings, plant, etc., at Spondon, also general charge (subject, etc.). (Note.—charge created by trust deed dated December 30, 1941, is postponed to this charge.) *£3,108,761. February 3, 1943.

PHILADELPHUS JEYES & CO., LTD., Northampton, chemists, etc. (M., 23/10/43.)—October 2, two mortgages, to National Provincial Bank, Ltd., each securing all moneys due or to become due to the Bank; charged on 3 Church Square, Market Harborough, and plant, etc., and 4 Kingsley Park Terrace, Northampton, and plant, etc., respectively. *£14,428. June 9, 1943.

New Companies Registered

Synthoid, Ltd. (383,071.)—Private company. Capital: £100 in 100 shares of £1 each. Electro, nickel, chromium and metal platers, bronzers, oxidisers, lacquerers, polishers, welders, etc. Directors: F. C. H. Katon; H. Webb. Registered office: 7 Warwick Court, Grays Inn, W.C.1.

Disney Industries, Ltd. (383,153).—Private company. Capital: £500 in 500 shares of £1 each. Analytical laboratories, consulting, manufacturing, physical and biological chemists manufacturers of toilet preparations, etc. G. Cofman-Nicoresti is the first director. Registered office: Ashmead House, Disney Street, S.E.1.

H. Mau, Ltd. (383,266.)—Private company. Capital: £1,000 in 1000 shares of £1 each. Manufacturers of and dealers in chemicals, oils, lubricants, disinfectants, fertilisers, tar, bitumen, etc. Subscribers: C. W. Lilley; P. P. Rough. Registered office: Canberra House, 313-319 Regent Street, W.1.

C. P. O. Products, Ltd. (383,260.)—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and dealers in chemicals, plastics, oils and greases, manufacturing and analytical chemists, research workers, etc. Directors: R. C. Ford; R. B. Hobson; R. G. G. Sedgwick; S. E. H. Eumarsh; Nina E. Firman. Registered office: 13 Orsett Road, Grays, Essex.

Diffusion Alloys, Ltd. (383,263).—Private company. Capital: £1000 in 1000 shares of £1 shares. Manufacturers of and dealers in corrosion- and acid-resisting alloys, consultants, research workers, analytical, consulting and manufacturing chemists, etc. Subscribers: C. W. Lilley; P. P. Rough. Registered office: Canberra House, 313-319 Regent Street, S.W.1.

Fuel & Metallurgical Processes, Ltd. (383,156.)—Private company. Capital: £2000 in 2000 ordinary shares of one shilling and 1900 preference shares of £1 each. To investigate and develop processes for the production and utilisation of products of the fuel, metallurgical, chemical, plastics and ancillary industries, to carry on the business of research workers, etc. Directors: E. C. Evans; D. H. Evans; J. E. O. Mayne. Registered office: 65 Bridge Street, Pinner, Middlesex.

Chemical and Allied Stocks and Shares

ALTHOUGH the volume of business in the stock and share markets failed to show improvement, industrial securities were inclined to rally, following the reaction that occurred towards the end of last week. Many shares of companies connected with the chemical and allied industries were little changed on balance.

Imperial Chemical have been quite well maintained at 38s. 4½d., and Lever & Unilever at 37s., while Borax Consolidated were 37s. 3d. Murex remained under the influence of the results, but eased to 101s. 3d. Nairn & Greenwich were again 68s. 9d., and Barry & Staines 43s. B. Laporte were firm and quoted at 80s. "middle." No change is generally expected in the forthcoming interim dividend of the last-named company, which invariably deals conservatively with profits; the question of an increase will no doubt be deferred until the final payment, when results for the whole year will be known. British Aluminium were well maintained at 47s. 3d., and British Oxygen slightly lower at 78s. 9d. following their recent rise.

Steadiness was shown in Imperial Smelting at 15s. 6d., while Amalgamated Metal were 18s. 9d. British Match showed firmness at 39s. 6d. On the other hand, Turner & Newall eased to 77s. 9d., and the units of the Distillers Co. reacted further to 89s. 3d., following their recent advance. United Molasses were 31s. 1½d. Cerebos ordinary improved to £9¾, the assumption being that the forthcoming interim dividend will be maintained, and a total of 40 per cent. again paid for the year. British Plaster Board 5s. ordinary, the interim payment on which is due shortly, were steady at 29s. Burt Boulton were again 20s.; in this case the financial results are imminent.

There were various interesting features among shares included in the iron, steel and kindred group. Dorman Long reacted to 30s. 3d. on the details of the plan for the redemption of the 5 per cent. debentures. On the other hand, United Steel were firmer at 25s. on further consideration of the financial results. Guest Keen improved to 34s. 9d., awaiting the interim dividend. Stewarts & Lloyds were 52s. 9d., and Tube Investments 92s. 9d. Announcement of the final dividend of the last-named company is due shortly. Babcock & Wilcox were 48s., and Allied Ironfounders strengthened to 49s., while Richard Thomas 6s. 8d. ordinary were steady at 10s. 6d. Textile shares failed to recover from their recent reaction. Bradford Dyers were 22s. 3d., and Calico Printers 17s. Courtaulds were 53s. 3d. Elsewhere, British Celanese at 32s. 1½d. were little changed on balance, but were inclined to fluctuate, pending publication of the results. In other directions, Associated Cement further improved to 65s. 6d. Wall Paper deferred units eased to 40s. 3d. but were firmly held, it being pointed out that despite the lower profits indicated for the past financial year the 4 per cent. dividend is again conservative. Triplex Glass, another share valued mainly on the strong balance sheet position, moved back to 37s. 3d. Blythe Colour 4s. ordinary were 8s. 6d., and Cellon 5s. ordinary 22s. 6d. Greeff-Chemicals 5s. ordinary were 7s. 9d., and Lawes Chemical 12s. 6d.

W. J. Bush remained firmly held and quoted at 55s. Monsanto Chemicals 5½ per cent. preference were 23s. 6d., and Morgan Crucible first preference 26s. 6d. In other directions, Boots Drug were 42s. 6d., and

Beechams Pills deferred slightly higher at 17s. 1½d., while Timothy Whites were 33s. 3d. "ex," the interim dividend, which has again been limited to 7½ per cent. Sangers improved to 23s. 10½d. Elsewhere, Low Temperature Carbonisation 2s. ordinary at 2s. 10d. have fully held the improvement which followed publication of the report and accounts. Gas Light & Coke ordinary were 19s. 3d. Following their recent reaction, oil shares reflected the somewhat firmer conditions which developed in Stock Exchange markets. Movements among shares of companies connected with plastics were small, although Thomas De La Rue reacted to 166s. 3d.

British Chemical Prices

Market Reports

REPLACEMENT orders for chemical products on the London market have been reported to a moderate extent during the past week, and steady movements of contract supplies continue. No price changes fall to be recorded and values generally remain on a firm basis. In the soda products section the position of caustic soda remains unchanged, both grades meeting with a steady inquiry, while buying interest in bicarbonate of soda and soda ash has been fairly substantial and quotations are well held. In both nitrate and acetate of soda a moderate weight of new business has been reported, and in the photographic and commercial grades of hyposulphite of soda a brisk inquiry has been dealt with. The potash chemicals generally maintain a very strong undertone. Fresh business in acid phosphate of potash is reported, and offers of yellow prussiate of potash remain on a restricted scale. Both caustic potash and bichromate of potash are meeting with an active demand, and distribution is carefully controlled. In other directions crude and refined glycerine are very firm at controlled levels and the demand is active, while a steady inquiry for the various grades of sulphur is reported. There has been no change in the position of alum lump and sulphate of alumina, both of which are being absorbed in good quantities. British-made formaldehyde meets with a steady inquiry and this also applies to peroxide of hydrogen and white powdered arsenic. There is nothing fresh to report from the coal-tar products market this week.

MANCHESTER.—Fairly satisfactory trading conditions have been reported on the Manchester chemical market during the past week. So far as contract deliveries are concerned these are on steady lines to most consumers and cover a wide range of soda compounds and also the magnesia and ammonia products, as well as the acids. The potash chemicals are mostly in short supply still. Moderate additions to order-books have resulted from market inquiries during the past few days. With regard to prices, these generally are on a firm basis.

GLASGOW.—In the Scottish heavy chemical trade there is no change form last week. Home business remains steady, while export trade still remains rather restricted. Prices generally keep very firm at previous levels.

SOUTH AFRICAN DRUGS

Many German patent medicines are being made in South Africa under special permit from the Government, which some time ago decided to put these at the disposal of the local chemical industry. Arrangements regarding these patents after the war will probably have to be the basis of special consideration. Some of the firms handling these preparations and other lines have been extending their plant, as they are now supplying the Rhodesias and Belgian Congo with chemical preparations previously imported from overseas. Large quantities of South African drugs and medicines have been used in North Africa and other war zones, and it is stated that many of these items have proved very satisfactory and a valuable contribution to the war effort.

Second-hand

DISTILLATION PLANT.

For Sale.

TRIPLE Effect EVAPORATOR, by McNeil, having brass tubed calandrias, giving a heating surface of 3,000 sq. ft.; Evaporator complete with jet condenser, interconnecting piping, etc.

Triple Effect EVAPORATING PLANT, by Scott, capacity 750 galls. per hour evaporation of water, comprising three effects, having one calandria fitted with 246 steel tubes 2 in. o.d. and two calandrias having 323 steel tubes 2 in. dia.; complete with separating pots, piping, etc.

Vertical EVAPORATOR, having cast iron calandria 3 ft. 9 in. dia. by 3 ft. 4 in. deep, containing 226—1¾ in. copper tubes; vapour portion of copper 3 ft. 9 in. dia. by 6 ft. 6 in. deep, complete with 10 in. dia. swan-neck connecting to floor mounting condenser 2 ft. 0 in. dia. by 7 ft. 0 in. long, containing 254—⅝ in. bore copper tubes.

Vertical Mild Steel Vacuum STILL, 4 ft. 2 in. dia. by 7 ft. 0 in. high, arranged with star steam heating coil in bottom; complete with barometric condenser 2 ft. 4 in. dia. by 4 ft. 4 in. deep, connected by swan-neck to mild steel separator 2 ft. 4 in. dia. by 3 ft. 0 in. long.

Steam Jacketed Copper STILL, by John Dore, 3 ft. 3 in. dia. by 5 ft. 0 in. deep, fitted with horizontal bow and scraper type agitating gear, driven through gearing from f. & l. pulleys; complete with swan-neck and condenser.

Steam Jacketed Copper STILL, 3 ft. 0 in. dia. by 4 ft. 8 in. deep, arranged with bolted on cast iron jacket and domed copper cover; manhole on side and inspection holes; Still mounted on fabricated mild steel stand.

Steam Jacketed Copper STILL, by John Dore, 3 ft. 0 in. dia. by 4 ft. 0 in. deep, complete with swan-neck and condenser.

Vertical all copper direct fired STILL, with body 2 ft. 0 in. dia. by 2 ft. 9 in. deep, connected by copper swan-neck to copper condenser carried in steel condenser tank 2 ft. 0 in. dia. by 3 ft. 0 in. deep; mounted in mild steel case; arranged for direct firing.

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WORKING NOTICE

THE Proprietors of the Patents Nos. 468,450 for Improvements in or relating to rosin size, and 475,259 Improvements in or relating to resin size are desirous of entering into arrangements by way of licence and otherwise on reasonable terms for the purpose of exploiting the same and ensuring their full development and practical working in this country. All communications should be addressed in the first instance to Haseltine Lake & Co., 28 Southampton Buildings, Chancery Lane, London, W.C.2.

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